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Sir:

Transmitted herewith for filing is the patent application of:

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FOR: HEAD SET SPEAKER AND STEREO PLAYING DEVICE

Enclosed are:

- ☒ A total of 5 sheet(s) of drawings. (*Informal*)
- ☒ An assignment of the invention to: \_\_\_\_\_
- ☒ A verified statement to establish small entity status under 37 CFR 1.9 and 37 CFR 1.27.
- ☒ An Information Disclosure Statement.
- ☒ A declaration.
- ☒ A Power of Attorney.
- ☒ Number of pages of text 21
- Other: \_\_\_\_\_
- ☒ The filing fee has been calculated as shown below:

Item:	Claims Filed	No. Extra	Rate	Fee	Rate	Fee
BASIC FEE				<u>\$345</u>		\$760
TOTAL CLAIMS	<u>    </u> - 20 =	<u>        </u>	x \$9	\$ <u>    </u>	x \$18	\$ <u>    </u>
INDEPENDENT CLAIMS	<u>    </u> - 3 =	<u>        </u>	x \$39	\$ <u>    </u>	x \$78	\$ <u>    </u>
RECORDING PATENT ASSIGNMENT				\$40.00		\$40.00
MULTIPLE DEPENDENT CLAIMS PRESENTED			+ \$130	\$ <u>    </u>	+ \$260	\$ <u>    </u>
TOTAL				<u>\$345</u>		\$ <u>    </u>

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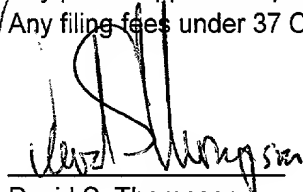
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**STATEMENT CLAIMING SMALL ENTITY STATUS  
(37 CFR 1.9(f) & 1.27(b))--INDEPENDENT INVENTOR**

Docket Number (Optional)

Applicant, Patentee, or Identifier: Glen T. Pass

Application or Patent No.: \_\_\_\_\_

Filed or Issued: \_\_\_\_\_

Title: Head Set Speaker & Stereo Radio Playing Device

As a below named inventor, I hereby state that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees to the Patent and Trademark Office described in:

- ☒ the specification filed herewith with title as listed above.  
☐ the application identified above.  
☐ the patent identified above.

I have not assigned, granted, conveyed, or licensed, and am under no obligation under contract or law to assign, grant, convey, or license, any rights in the invention to any person who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern, or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

- ☒ No such person, concern, or organization exists.  
☐ Each such person, concern, or organization is listed below.

Separate statements are required from each named person, concern, or organization having rights to the invention stating their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

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Aug 2 2000  
Date

Date

Date

1 HEAD SET SPEAKER AND STEREO PLAYING DEVICE

2 by

3 Glen Poss, of 11422 Charles Road, Nine Mile Falls, WA 99026.

4  
5 CROSS-REFERENCES

6 There are no applications related to this application filed in this or any foreign  
7 country.

8 BACKGROUND

9 The use of head set speakers is well-known, including those which receive radio  
10 transmissions and those which are attached to cassette, CD ROM and MP3 playing devices.  
11 Such head set speakers have several advantages over loudspeaker systems. They reduce  
12 interference with other people, provide high fidelity, and tend to minimize the interference  
13 of background noise present in the listening environment.

14 Unfortunately, known head set speakers have a tendency to prevent the wearer from  
15 hearing ambient sound. For example, where a runner is wearing a head set, the sound of  
16 the approach of an on-coming car may go unnoticed.

17 Where a typical head set is equipped with a radio tuner, it is generally the case that  
18 reception is at times markedly worse than larger receivers with superior antennas. In an  
19 effort to maximize portability and to minimize size, designers have generally failed to  
20 optimize antenna functionality. As a result, the antenna is inadequate for reception in  
21 many conditions.

22 Similarly, in part due to their smaller size, some of the speakers used in the  
23 construction of head sets are not as responsive, do not have the range and tend to have  
24 greater distortion than speakers constructed without regard to size.

25 What is needed is a head set having a built-in tuner, superior speaker fidelity and a  
26 more effective antenna design.

## SUMMARY

The present invention is directed to an apparatus that satisfies the above needs. A novel head speaker and stereo playing device is disclosed that has a built-in tuner, superior speaker fidelity and a more effective antenna design. Versions of the invention are adapted for use with cassette, CD, MP3 and other technologies.

The head set speaker of the present invention provides some or all of the following structures.

- (A) A headpiece is both resilient and flexible, and is designed to go behind the head, typically at approximately ear level. A flexible arch adjusts for the user's head size. Left and right upper curves extend over the ears during use. Left and right ends of the headpiece support left and right ear device enclosures, respectively.
- (B) Left and right ear flanges extend downwardly from a rear portion of the left and right upper curves. During use, the ear flanges are located behind the ear of the user, in a manner similar to the stem of eye glasses. The ear flanges tend to prevent the headpiece from moving too far forward, particularly where the headpiece is sized to accommodate a larger wearer.
- (C) Left and right ear device enclosures carry the battery assemblies, circuit boards and speaker assemblies. In a preferred embodiment, an aerodynamic front end and a rounded back end of each ear device enclosure results in lower wind resistance and wind interaction. This is particularly important for runners, bicyclist and in-line skaters, and results in greater acoustic fidelity, due to the reduction in the sounds of air moving.
- (D) A battery assembly is carried within each ear device enclosure. In a preferred embodiment, each battery assembly includes a somewhat heart-shaped enclosure which contains two batteries. The battery assembly enclosure may be detached from the ear device enclosure, and inserted into a charging unit for recharging.
- (E) A circuit board is carried within one of the ear device enclosures. A preferred circuit board includes a radio signal processing integrated circuit (IC), a volume controlling

1 IC and a power amplification IC. Input to the circuit board includes an on/off switch,  
2 volume up and down switches, a frequency scan switch and a reset switch. An  
3 antenna lead, in communication with the appropriate input on the radio signal  
4 processing IC, is attached to at least one speaker magnet.

5 (F) A speaker assembly is present in each ear device enclosure. Each speaker assembly  
6 includes a speaker directed outwardly, away from the user's ear. A sound reflecting  
7 wall, located in front of each speaker, reflects the sound from the speaker toward the  
8 user's ear. The speaker magnet of each speaker assembly extends through a hole  
9 defined in the ear device enclosure, allowing contact with the listener's skin.

10 (G) A charging unit includes a base having appropriate terminal posts and retaining  
11 clips to receive and charge the battery assemblies from each ear device enclosure.

12  
13 It is therefore a primary advantage of the present invention to provide a novel head  
14 set speaker and stereo radio playing device wherein the speaker cone is oriented away from  
15 the user's ear and sound is reflected back to the user.

16  
17 Another advantage of the present invention is to provide a novel head set speaker  
18 and stereo radio playing device wherein an antenna input to the tuning circuit is connected  
19 to the speaker magnet and wherein the speaker magnet extends from the ear device  
20 enclosure to allow contact with the user's skin, thereby allowing the body of the user to form  
21 a part of the antenna.

22  
23 Another advantage of the present invention is to provide a novel head set speaker  
24 and stereo radio playing device wherein left and right ear device enclosures have an  
25 aerodynamically curved front end and a rounded back end for minimizing air whistle when  
26 the user is moving rapidly, such as on a bicycle or in-line skates.

27  
28 A still further advantage of the present invention is to provide a novel head set

1 speaker and stereo radio playing device having a behind-the-neck headpiece having upper  
2 curves which extend over each ear and ear flanges which locate speakers forward of the ears  
3 in a manner which allows some ambient sound to be heard.

4  
5 Other objectives, advantages and novel features of the invention will become  
6 apparent to those skilled in the art upon examination of the specification and the  
7 accompanying drawings.

## DRAWINGS

These and other features, aspects, and advantages of the present invention will become better understood with regard to the following description, appended claims, and accompanying drawings where:

FIG. 1 is an isometric view of a version of the head set speaker and stereo radio playing device, oriented as if worn by a person looking to the right, with the headpiece behind the head of the wearer, and the perspective taken from above and behind the right ear.

FIG. 2 is an isometric view of the head set speaker and stereo radio playing device of FIG. 1, oriented as if worn by a person looking to the left, with the headpiece behind the head of the wearer, and the perspective taken from below and behind the left ear.

FIG. 3 is an orthographic view of the head set of FIG. 1, oriented as if worn by a person looking to the left.

FIG. 4 is an enlarged orthographic view of the outside surface of the left ear enclosure of FIG. 3.

FIG. 5 is an enlarged orthographic view of the inside surface of the right ear enclosure.

FIG. 6 is an orthographic view of the rear surface of the left ear enclosure.

FIG. 7 is an orthographic view of the front surface of the left ear enclosure.

FIG. 8 is a cross-sectional view of a first version of an ear enclosure.

FIG. 9 is a cross-sectional view of a second version of an ear enclosure.



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FIG. 10 is an isometric view of a version of the battery assembly.

FIG. 11 is an isometric view of a version of the battery charging unit.

FIG. 12 is an isometric view of the AC plug unit associated with the battery charging unit.

FIG. 13 is a circuit diagram of a version of the head set speaker and stereo radio playing device.

## DESCRIPTION

Referring in to FIG. 1, a head set speaker and stereo playing device 10 constructed in accordance with the principles of the invention is seen. The stereo playing device is adapted for use with radio, cassette, CD ROM, MP3 or other source of musical information. A resilient and flexible headpiece 20 is sized to fit behind the head of the user. Right and left device enclosures 50, 60 are carried by the ends of the headpiece, and are aerodynamic shaped to minimize wind whistle which may result when the head set is worn while moving rapidly. Right and left behind the ear flanges 40 extend downwardly from a position adjacent to the ends of the headpiece, and aid in the positioning of the right and left ear device enclosures. In a typical application, the device enclosures are positioned immediately forward of the user's ears, allowing ambient sound to be heard. A speaker assembly 120 and a removable battery assembly 80 are carried within each device enclosure. The speakers are oriented within the device enclosures 50, 60 with the speaker magnet directed to, and in contact with, the head of the listener. This achieves two interrelated and significant structural and electronic advantages. First, sound fidelity is improved by using sound reflecting walls and baffles to redirect the sound. And second, antenna functionality is improved by attaching an antenna input to the speaker magnet which is in contact with the listener's skin, and there by connecting the listener's body to the antenna. A charging unit 140 is sized to receive both battery assemblies simultaneously. A circuit card 100, carried within one of the device enclosures contains a stereo radio circuit. On/off, volume up, volume down, scan and reset buttons carried by the device enclosures are in electrical communication with the circuit card, and allow control over radio functionality.

A headpiece 20 supports the right and left device enclosures in a position immediately forward of the user's ears. As seen particularly in FIGS. 1 and 2, the headpiece is oriented substantially horizontally during use, and wraps about the back of the user's head, at approximately the ear level, just above the collar line.

1 A preferred headpiece includes an arch 21, made of a flexible and resilient  
2 material. Due to the characteristics of the material, the headpiece biases an inner half  
3 piece 61 of each device enclosure gently against the user's head, and additionally, adjusts  
4 to fit the head of larger and smaller users.

5 Wires connecting the left and right device enclosures 50, 60 pass through an interior  
6 channel defined within the headpiece 20. The wires provide communication between the  
7 switches and speakers carried within those enclosures.

8 The left and right ends of the flexible arch 21 carry left and right over-the-ear upper  
9 curves 22, 23. The shape of the upper curves correspond to the head shape and ear  
10 location of the average user. As seen particularly in FIGS. 1 - 3, the upper curve prevents  
11 contact between the headpiece 20 and the user's ear by touching the user's head at a  
12 position higher than the user's ear.

13 Left and right ends 24, 25 of the headpiece support left and right device enclosures,  
14 50, 60 respectively.

15  
16 Referring particularly to FIGS. 1 - 3, mirror image left and right ear flanges 40, 41  
17 extend downwardly from a rear portion of the left and right upper curves 22, 23, in the area  
18 of confluence of the upper curves and the ends of the flexible arch 21. During use, the ear  
19 flanges 40, 41 are located behind the left and right ears of the user, in a manner similar to  
20 the stem of eyeglasses. The ear flanges tend to prevent the headpiece from moving too far  
21 forward, particularly where the headpiece is sized to accommodate a larger wearer.

22 While a number of configurations are consistent with the structure and functionality  
23 of the ear flanges shown in FIGS. 1 - 3, a typical ear flange includes a base 42 from which  
24 extends a loop 43 having a downwardly oriented tip 44. A passage 45 may be defined  
25 through the loop 43.

26  
27 Left and right ear device enclosures 50, 60 enclose the battery assemblies 80, circuit  
28 boards 100 and speaker assemblies 120. In a preferred embodiment, the enclosures are

1 made of an inner half piece 61 and an outer half piece 62, the perimeters 64 of which are  
2 snapped together after the enclosed assemblies are installed. Optionally, interlocking edges  
3 65 may be used to result in a more secure connection.

4 It is a feature of the preferred embodiment that the friction of the air flow around the  
5 device enclosures is minimized due to the shape of the enclosure. This minimization is  
6 particularly important for runners, bicyclist and in-line skaters, and results in greater acoustic  
7 fidelity, due to the advantageous reduction in the whistling sounds of air moving.

8 An aerodynamic front end 68 has a radius that is less than the radius of the rounded  
9 back end 69. In combination, the perimeter of the enclosure is substantially tear drop  
10 shaped. The tear drop shape contributes to lower air friction and air resistance. These  
11 factors in turn contribute to less background noise and higher fidelity.

12 Because the user's ear is typically slightly behind the rounded back end 69, the  
13 orientation of the enclosures with the end 68 having the smaller radius forward of the end 69  
14 having the larger radius is preferred. With this configuration, when the enclosures are  
15 rapidly moving through air, each of the user's ears is somewhat sheltered immediately  
16 behind the rounded back end 69 of each of the enclosures. Air streams are diverted around  
17 the user's ears, or the air streams are slowed before contact with the ear.

18 A battery unit indentation 63 on each enclosure 50, 60 is sized to accept a  
19 battery assembly 80. The battery indentation may be on the inside, next to the user's ear, as  
20 seen in FIG. 9, or may be on the outside, opposite the user's ear, as seen in FIG. 8. In either  
21 case, the battery indentation allows the enclosures 50, 60 to fit flush with the outer surface of  
22 the device enclosure.

23 An opening 66, through which the speaker magnet extends, is defined in the inner  
24 half piece 61 of each enclosure. Arrayed about the opening 66 is a plurality of holes 67 for  
25 allowing the passage of sound from the interior 71 of the enclosure.

26 Referring to FIG. 1, a number of holes and buttons supported by the right enclosure  
27 may be seen. An LED hole 70 allows a power-on indicator LED 104 to be seen during  
28 operation. An on/off button 72 and associated hole allows the user to access the on/off

1 switch 106 on the circuit board 100. Similarly, a volume up button 73 and a volume down  
2 button 74 extend through their associated holes defined in the right enclosure, and allow  
3 the user to manipulate the volume up and volume down switches 107, 108 on the circuit  
4 board 100.

5 Referring to FIG. 2, a number of holes and buttons supported by the left enclosure  
6 may be seen. A scan button 75 and a reset button 76 extend through their associated holes  
7 defined in the left enclosure.

8  
9 As seen particularly in FIGS. 8, 10 and 12, during periods of operation, a battery  
10 assembly 80 is carried within each ear device enclosure. During operation, the left and right  
11 battery assemblies jointly supply the power required by the circuit board 100 and speaker  
12 assemblies 120. When required, both battery assemblies may be detached from the ear  
13 device enclosure and inserted into the base unit 141 of the charging assembly 140 where  
14 they may be completely recharged.

15 In a preferred embodiment, each battery assembly includes a somewhat heart-  
16 shaped enclosure 81 which contains two batteries 85. As seen best in FIGS. 1 and 2, the  
17 heart-like shape conforms to the shape of the aerodynamic front end 68 of the enclosure.  
18 The enclosure may provide a first fastening device such as locking tab 82 which engages the  
19 enclosures 50, 60 when in use.

20 Referring particularly to FIGS. 10 and 11, a second fastening device such as the two  
21 alignment tabs 83 on each battery assembly engage recesses 145 defined in the charging  
22 unit 140. Terminal holes 84 defined in the enclosure 81 allow the terminal posts 146 of the  
23 charging unit to electrically access the batteries during the recharging period, and allow  
24 similar posts on the circuit board to access the batteries during operation.

25  
26 As seen in FIGS. 9 and 10, a circuit board 100 is carried within one of the ear device  
27 enclosures 50, 60. Alternatively, where space is too constrained, the circuit board may be  
28 divided, and a portion carried by each ear device enclosure. The stereo playing device 10

is adapted for use with radio, cassette, CD ROM, MP3 or other source of musical information, and therefore some variation of the circuit may be made to adapt to these applications. Referring additionally to FIG. 13, the details of a preferred version of the circuitry using FM radio may be understood. A preferred circuit board includes a radio signal processing integrated circuit (IC) 101, a volume controlling IC 102 and a power amplification IC 103. Referring to FIG. 13, in very general terms, the radio signal processing and volume controlling ICs provide input to the power amplification IC. That is, radio signal information and volume degree information are communicated to IC 103 by ICs 101 and 102, respectively. Input to the circuit board includes several switches. An on/off switch 106 is in communication with the source of battery power. Volume up and down switches 107, 108, are in communication with the volume controlling IC 102. A frequency scan switch 109 and a reset switch 110 are in communication with the radio signal processing circuit. As seen in FIG. 13, a power on LED 104 is lit during operation due to its position in the circuit adjacent to the on/off switch and battery.

The scan 109 and reset 110 switches are input into the radio frequency tuning and processing IC 101. By manipulation of these switches the user is able to control the radio station selection in a known manner.

Referring primarily to FIG. 13, a first end of an antenna lead 111 is in communication with the appropriate input on the radio signal processing IC, while a second end is attached to at least one speaker magnet 121. As a result, one or both speaker magnets is electrically attached to the antenna input of the radio signal processing IC. Since both speakers magnets extend through holes 66 defined in the inside of each enclosure, both speaker magnets come into contact with the skin of the listener during operation. Due to this contact, some electrical information is passed from the body of the listener into the antenna input on the signal processing IC. This results in the listener's body acting as part of the antenna during operation.

The volume up and down switches 107, 108, are connected to the volume controlling IC 102, which also receives input from the radio signal processing IC 101. The

1 output of the volume controlling IC is an input to the amplification IC 103, which drives the  
2 speakers 105.

3  
4 Referring particularly to FIGS. 9 and 13, a speaker assembly 120 is present in each  
5 ear device enclosure 50, 60. Each speaker assembly includes the speaker 105, having a  
6 magnet 121 and cone 122. Because the speaker is oriented outwardly, away from the  
7 listener's ears, a sound reflecting wall 123 and baffles 124 redirect the sound for passage  
8 from the enclosures 50, 60 through the array of holes 67.

9 As seen in the cross-section view of FIG. 9, the speaker magnet 121 of each speaker  
10 is directed toward the listener. The rear surface of each speaker magnet 121 extends  
11 through a hole 66 defined in the ear device enclosure. During operation, physical contact  
12 between the rear surface of each speaker magnet and the listener's skin provides electrical  
13 communication between the listener's body and the antenna input on the radio signal  
14 processing IC 101. As a result, the size and typically vertical orientation of the listener helps  
15 to contribute to the clarity of the radio transmission signal received.

16 Continuing to refer to the cross-sectional view of FIG. 9, a sound reflecting wall 123  
17 is located on an inside surface of the outer half piece 62 of the enclosure, in front of the  
18 cone 122 of each speaker. The sound reflecting wall may have one or more baffles 124 to  
19 reflect the sound from the speaker toward the user's ear. The sound waves produced by the  
20 cone 122 are therefore reflected by the wall 123 and baffles 124, allowing them to exit from  
21 the enclosures through the array of holes 67 adjacent to the user's ear.

22  
23 A charging unit 140 includes a base unit 141 adapted to receive and charge two  
24 battery assemblies 80 and a plug unit 142 which is adapted for installation in an AC outlet,  
25 and which supplies low-voltage, low-amperage direct current to the base unit. A cord 143  
26 connects the base unit to the plug unit.

27 Referring particularly to FIG. 11, a preferred version of the base unit 141 is seen.  
28 Left and right recesses 144 are sized to receive the corresponding battery assemblies 80.

1 Alignment tab recesses 145 are sized to engage the alignment tabs 83 of each battery  
2 assembly. Terminal posts 146 insert into the terminal holes 84 of each battery assembly.  
3 Retaining clips 147 engage the locking tab 82 of each battery assembly, preventing  
4 unwanted movement during the charging process.

5 Continuing to refer to FIG. 11, it can be seen that a centrally located power-on LED  
6 148 gives the user an indication that the charging unit is plugged into an active AC outlet.  
7 Left and right battery charging LEDs 149 indicate that the respective battery assembly is  
8 currently being charged.

9  
10 The previously described versions of the present invention have many advantages,  
11 including a primary advantage of providing a novel head set speaker and stereo radio  
12 playing device wherein the speaker cone is oriented away from the user's ear and sound is  
13 reflected back to the user.

14  
15 Another advantage of the present invention is to provide a novel head set speaker  
16 and stereo radio playing device wherein an antenna input to the tuning circuit is connected  
17 to the speaker magnet and wherein the speaker magnet extends from the ear device  
18 enclosure to allow contact with the user's skin, thereby allowing the body of the user to form  
19 a part of the antenna.

20  
21 Another advantage of the present invention is to provide a novel head set speaker  
22 and stereo radio playing device wherein left and right ear device enclosures have an  
23 aerodynamically curved front end and a rounded back end for minimizing air whistle when  
24 the user is moving rapidly, such as on a bicycle or in-line skates.

25  
26 A still further advantage of the present invention is to provide a novel head set  
27 speaker and stereo radio playing device having a behind-the-neck headpiece having upper  
28 curves which extend over each ear and ear flanges which locate speakers forward of the ears



1 in a manner which allows some ambient sound to be heard.

2  
3 Although the present invention has been described in considerable detail and with  
4 reference to certain preferred versions, other versions are possible. For example, while a  
5 preferred headpiece, ear flanges and ear device enclosures have been disclosed, a similar  
6 configuration could achieve some of the same advantages. Therefore, the spirit and scope  
7 of the appended claims should not be limited to the description of the preferred versions  
8 disclosed.

9  
10 In compliance with the U.S. Patent Laws, the invention has been described in  
11 language more or less specific as to methodical features. The invention is not, however,  
12 limited to the specific features described, since the means herein disclosed comprise  
13 preferred forms of putting the invention into effect. The invention is, therefore, claimed in  
14 any of its forms or modifications within the proper scope of the appended claims  
15 appropriately interpreted in accordance with the doctrine of equivalents.

1 What is claimed is:

2 1. A head set speaker and stereo playing device for use by a listener, comprising:

3 (A) a resilient and flexible headpiece;

4 (B) left and right ear device enclosures;

5 (C) a circuit board, carried within one of the ear device enclosures; and

6 (D) a speaker assembly, carried within each ear device enclosure, each speaker  
7 assembly comprising:

8 (a) a speaker directed outwardly, with a cone directed toward the outer  
9 half piece of the ear device enclosure;

10 (b) a sound reflecting wall, located in front of each speaker, reflects the  
11 sound from the speaker toward the user's ear; and

12 (c) a speaker magnet extending through a hole defined in the ear  
13 device enclosure, whereby the speaker magnet is in contact with the  
14 listener when in use.

15  
16 2. The head set speaker and stereo playing device of claim 1, wherein the resilient and  
17 flexible headpiece comprises:

18 (A) a flexible arch sized to go behind the listener's head; and

19 (B) left and right upper curves sized to go over the listener's ears, terminating in  
20 left and right ends.

21  
22 3. The head set speaker and stereo playing device of claim 2, additionally comprising  
23 left and right ear flanges, extending downwardly from a rear portion of the left and  
24 right upper curves.

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- 1 4. The head set speaker and stereo playing device of claim 1, wherein each ear device  
2 enclosure comprises an inner half piece mated to an outer half piece, and whereby  
3 the combined inner and outer half pieces define an aerodynamic front end and a  
4 rounded back end, wherein the aerodynamic front end has a radius that is less than  
5 the radius of the rounded back end.  
6  
7 5. The head set speaker and stereo playing device of claim 1, additionally comprising  
8 left and right battery assemblies, removably carried within the left and right ear  
9 device enclosures, each battery assembly comprising:  
10 (A) a heart-shaped enclosure containing two batteries;  
11 (B) first fastening means, carried by the hear-shaped enclosure, for attachment  
12 of the battery assembly to an ear device enclosure; and  
13 (C) second fastening means, carried by the hear-shaped enclosure, for  
14 attachment of the battery assembly to a charging unit.  
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6. The head set speaker and stereo playing device of claim 1, wherein the circuit board comprises:

- (A) a radio signal processing circuit;
- (B) a volume controlling circuit;
- (C) a power amplification IC, receiving radio signal information from the radio signal processing circuit and volume level information from the volume controlling circuit;
- (D) an on/off switch in electrical communication with the battery assembly;
- (E) volume up and down switches in communication with the volume controlling circuit;
- (F) a frequency scan switch and a reset switch in communication with the radio signal processing circuit; and
- (G) an antenna lead, in electrical communication with the radio signal processing IC.

7. The head set speaker and stereo playing device of claim 2, wherein each ear device enclosure comprises an inner half piece mated to an outer half piece, and whereby the combined inner and outer half pieces define an aerodynamic front end and a rounded back end, wherein the aerodynamic front end has a radius that is less than the radius of the rounded back end.

1 8. The head set speaker and stereo playing device of claim 7, additionally comprising  
2 left and right battery assemblies, removably carried within the left and right ear  
3 device enclosures, each battery assembly comprising:

- 4 (A) a heart-shaped enclosure containing two batteries;  
5 (B) first fastening means, carried by the hear-shaped enclosure, for attachment  
6 of the battery assembly to an ear device enclosure; and  
7 (C) second fastening means, carried by the hear-shaped enclosure, for  
8 attachment of the battery assembly to a charging unit.

9  
10 9. The head set speaker and stereo playing device of claim 8, additionally comprising  
11 a charging unit, comprising:

- 12 (A) a base unit, comprising two pair of terminal post means for charging the left  
13 and right battery assemblies and retaining clip means to engage the second  
14 fastening means each ear device enclosure; and  
15 (B) a plug unit, in electrical communication with the base unit.

- 1 10 A head set speaker and stereo playing device for use by a listener, comprising:
- 2 (A) a resilient and flexible headpiece, comprising:
- 3 (a) a flexible arch sized to go behind the listener's head; and
- 4 (b) left and right upper curves sized to go over the listener's ears,
- 5 terminating in left and right ends;
- 6 (B) left and right ear flanges, extending downwardly from a rear portion of the
- 7 left and right upper curves;
- 8 (C) left and right ear device enclosures, each ear device enclosure comprising
- 9 an inner half piece mated to an outer half piece, whereby the combined
- 10 inner and outer half pieces define an aerodynamic front end and a rounded
- 11 back end, wherein the aerodynamic front end has a radius that is less than
- 12 the radius of the rounded back end;
- 13 (D) left and right battery assemblies, removably carried within the left and right
- 14 ear device enclosures, each battery assembly comprising:
- 15 (a) a heart-shaped enclosure containing two batteries;
- 16 (b) first fastening means, carried by the hear-shaped enclosure, for
- 17 attachment of the battery assembly to an ear device enclosure; and
- 18 (c) second fastening means, carried by the hear-shaped enclosure, for
- 19 attachment of the battery assembly to a charging unit;
- 20 (E) a circuit board, carried within one of the ear device enclosures, comprising:
- 21 (a) a radio signal processing circuit;
- 22 (b) a volume controlling circuit;
- 23 (c) a power amplification IC, receiving radio signal information from the
- 24 radio signal processing circuit and volume level information from the
- 25 volume controlling circuit;
- 26 (d) an on/off switch in electrical communication with the battery
- 27 assembly;
- 28 (e) volume up and down switches in communication with the volume

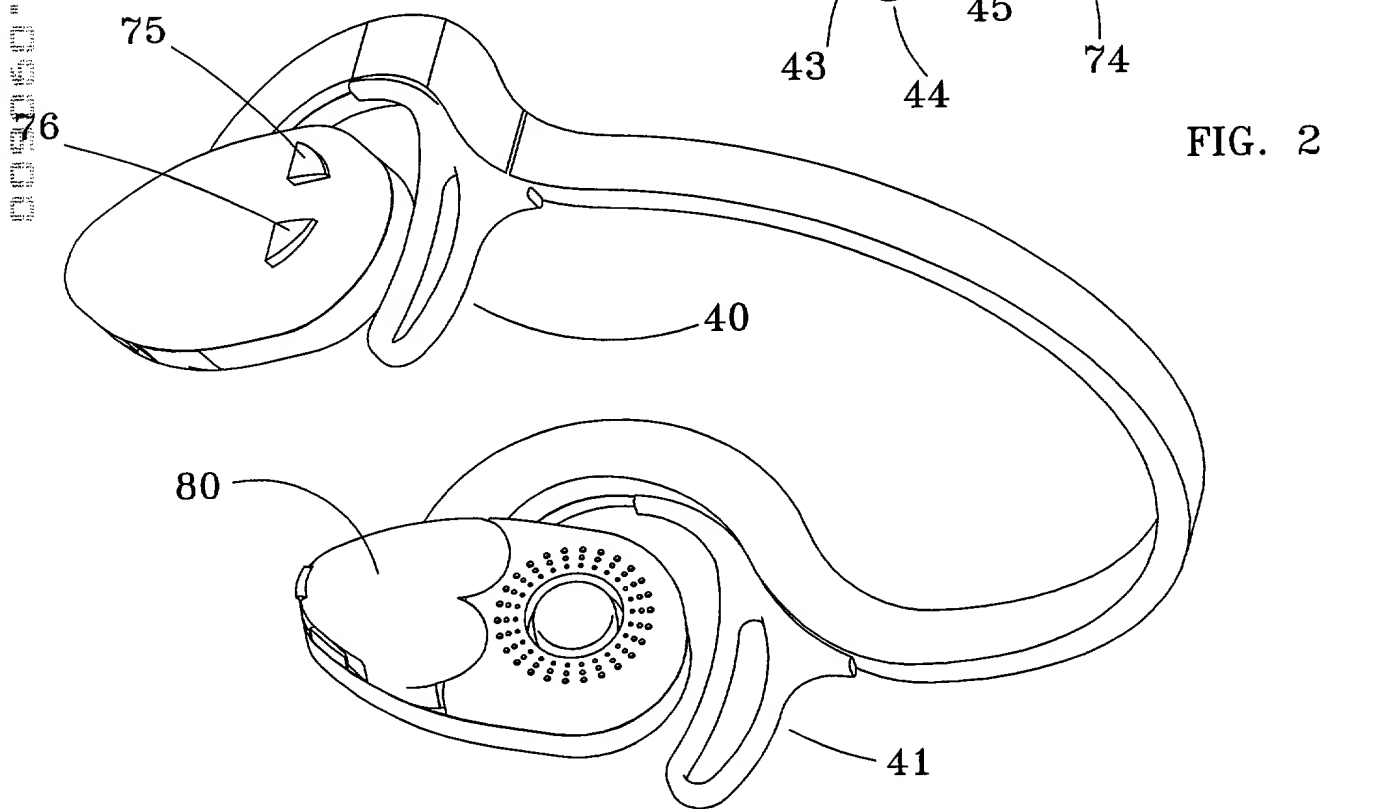
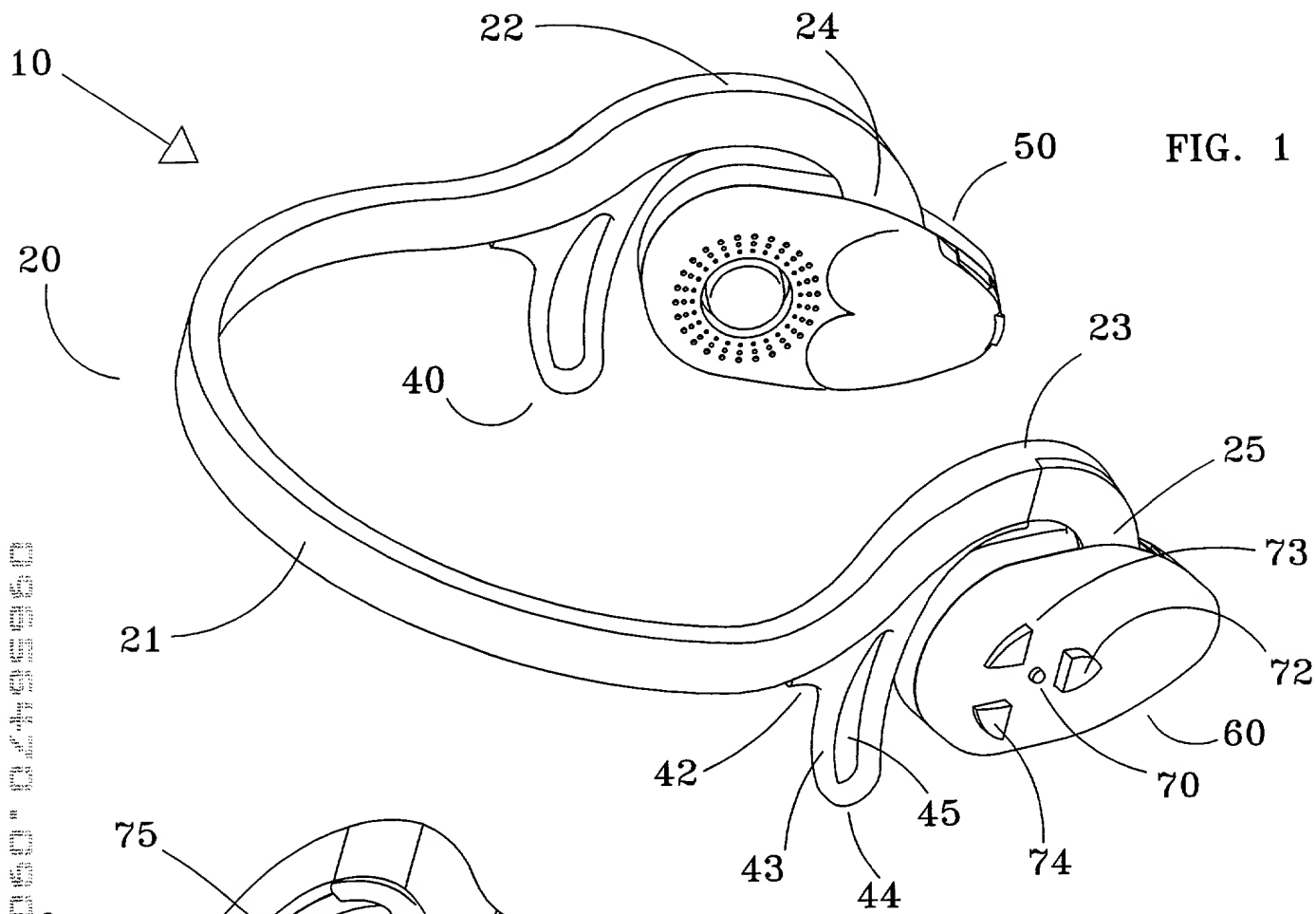
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- controlling circuit;
- (f) a frequency scan switch and a reset switch in communication with the radio signal processing circuit; and
- (g) an antenna lead, in electrical communication with the radio signal processing IC;
- (F) a speaker assembly, carried within each ear device enclosure, each speaker assembly comprising:
  - (a) a speaker directed outwardly, with a cone directed toward the outer half piece of the ear device enclosure;
  - (b) a sound reflecting wall, located in front of each speaker, reflects the sound from the speaker toward the user's ear; and
  - (c) a speaker magnet extending through a hole defined in the inner half piece of the ear device enclosure; and
- (G) a charging unit, comprising:
  - (a) a base unit, comprising two pair of terminal post means for charging the left and right battery assemblies and retaining clip means to engage the second fastening means each ear device enclosure; and
  - (b) a plug unit, in electrical communication with the base unit.

## ABSTRACT

A head set speaker and stereo radio playing device exhibits improved improved harmonics and acoustic fidelity. A resilient and flexible headpiece is sized to fit behind the head of the user. Right and left device enclosures are carried by the ends of the headpiece, and are aerodynamic shaped to minimize wind whistle which may result when the head set is worn while moving rapidly. Right and left behind the ear flanges extend downwardly from a position adjacent to the ends of the headpiece, and aid in the positioning of the right and left ear device enclosures. In a typical application, the device enclosures are positioned immediately forward of the user's ears, allowing ambient sound to be heard. A speaker assembly and a removable battery assembly are carried within each device enclosure. The speakers are oriented within the device enclosures with the speaker magnet directed to, and in contact with, the head of the listener. This achieves two interrelated and significant structural and electronic advantages. First, sound fidelity is improved by using sound reflecting walls and baffles to redirect the sound. And second, antenna functionality is improved by attaching an antenna input to the speaker magnet which is in contact with the listener's skin, and there by connecting the listener's body to the antenna. A charging unit is sized to receive both battery assemblies simultaneously. A circuit card carried within one of the device enclosures contains a stereo radio circuit. On/off, volume up, volume down, scan and reset buttons carried by the device enclosures are in electrical communication with the circuit card, and allow control over radio functionality.





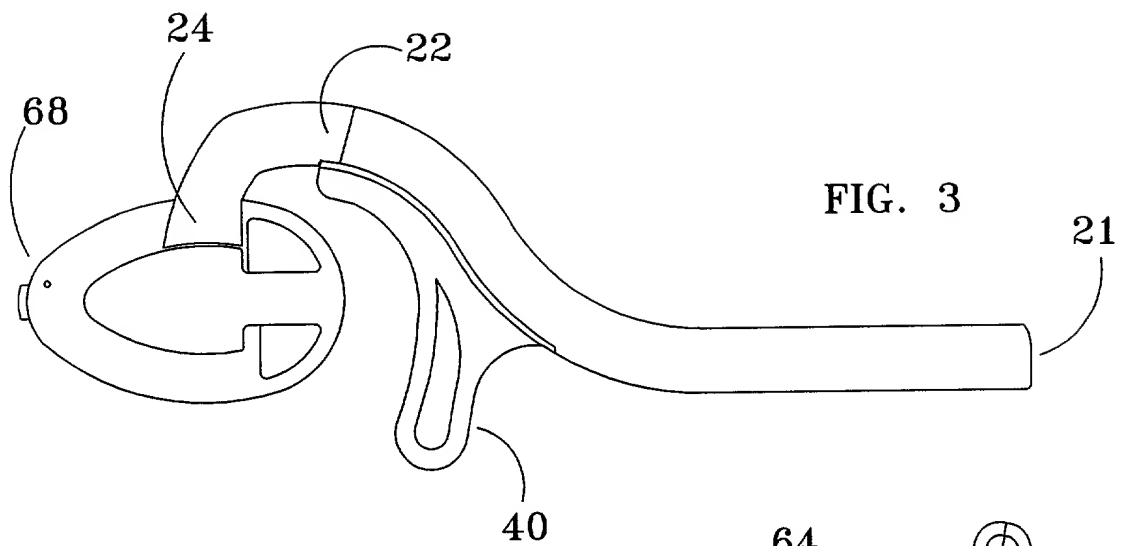


FIG. 3

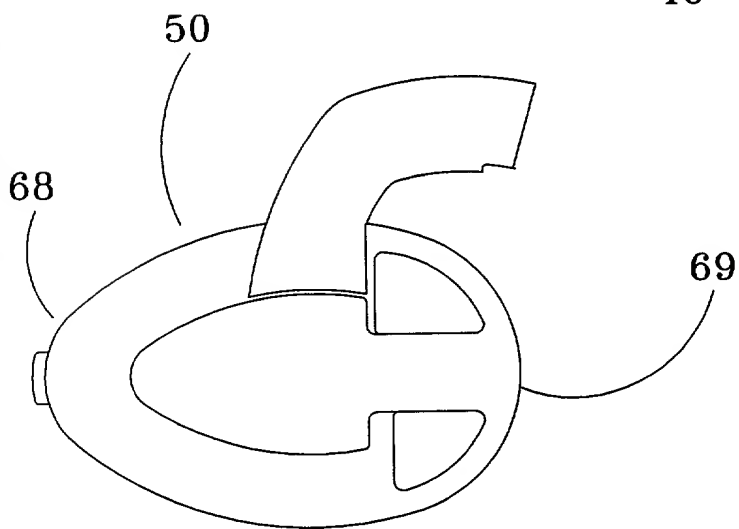


FIG. 4

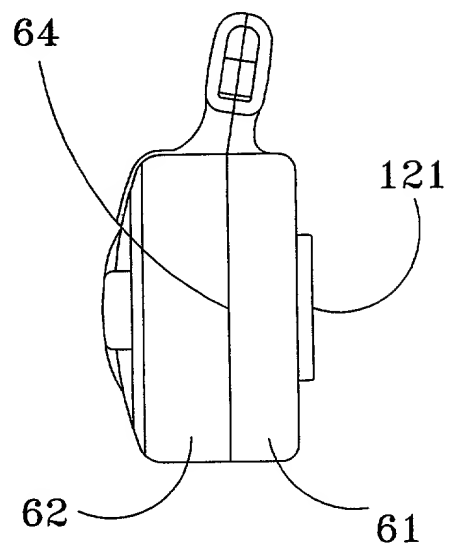


FIG. 6

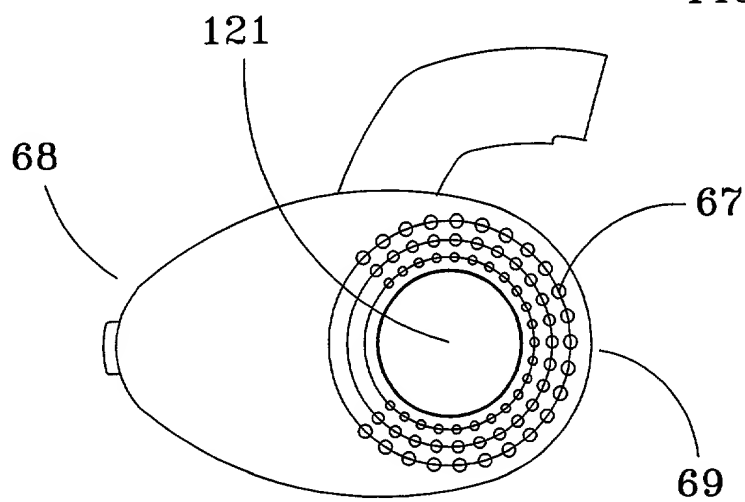


FIG. 5

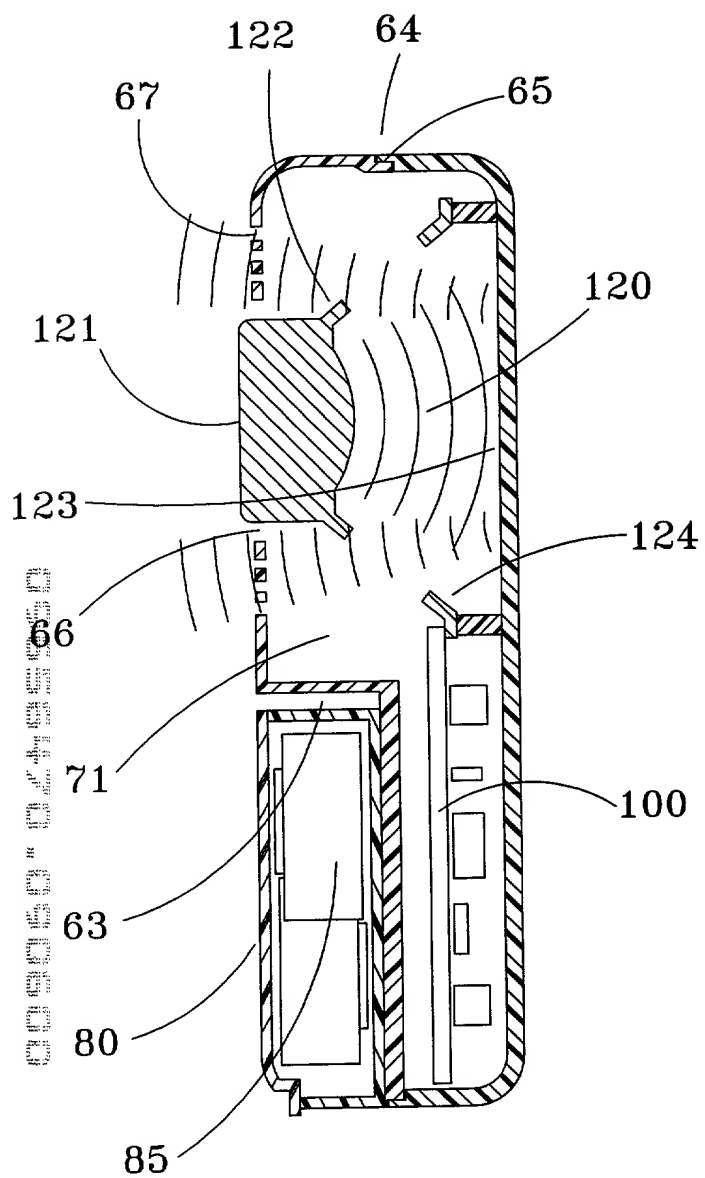


FIG. 9

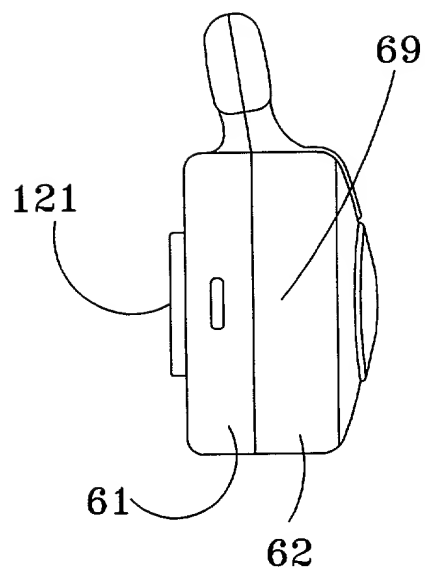


FIG. 7

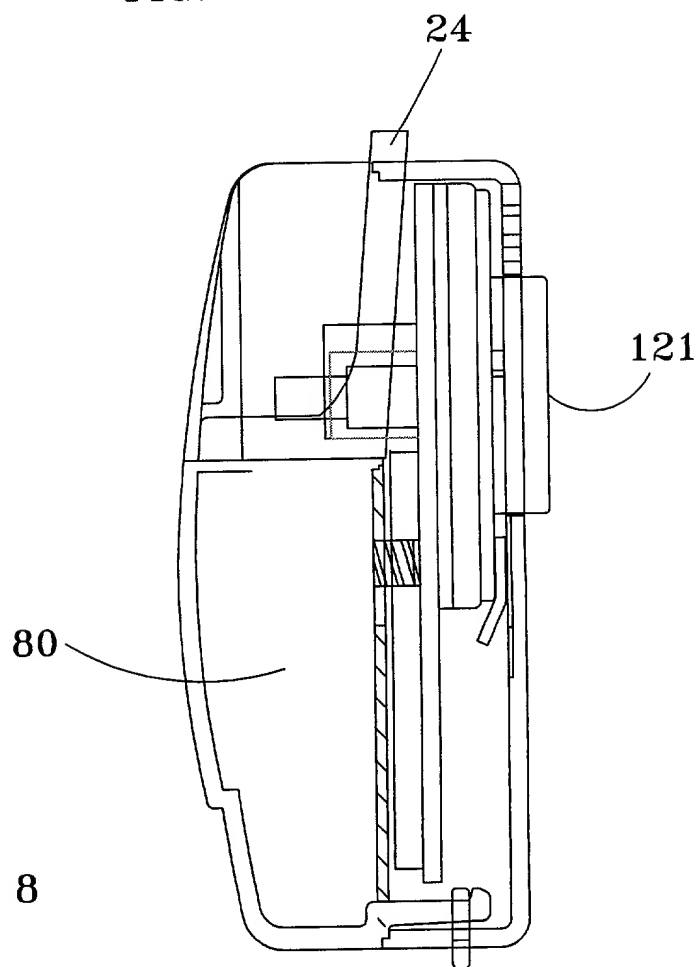
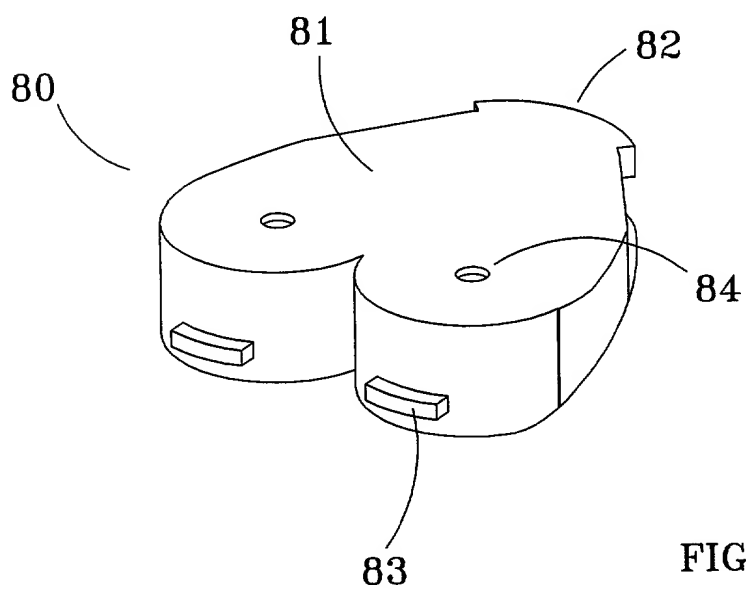
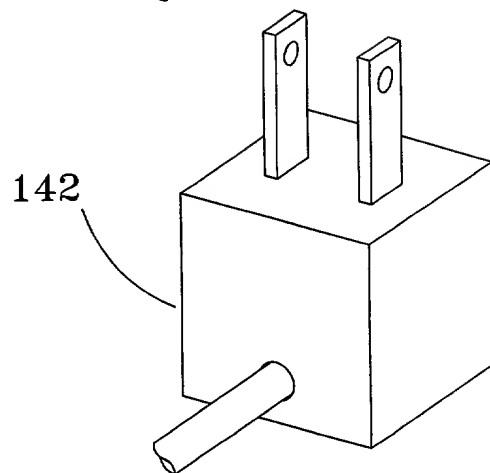
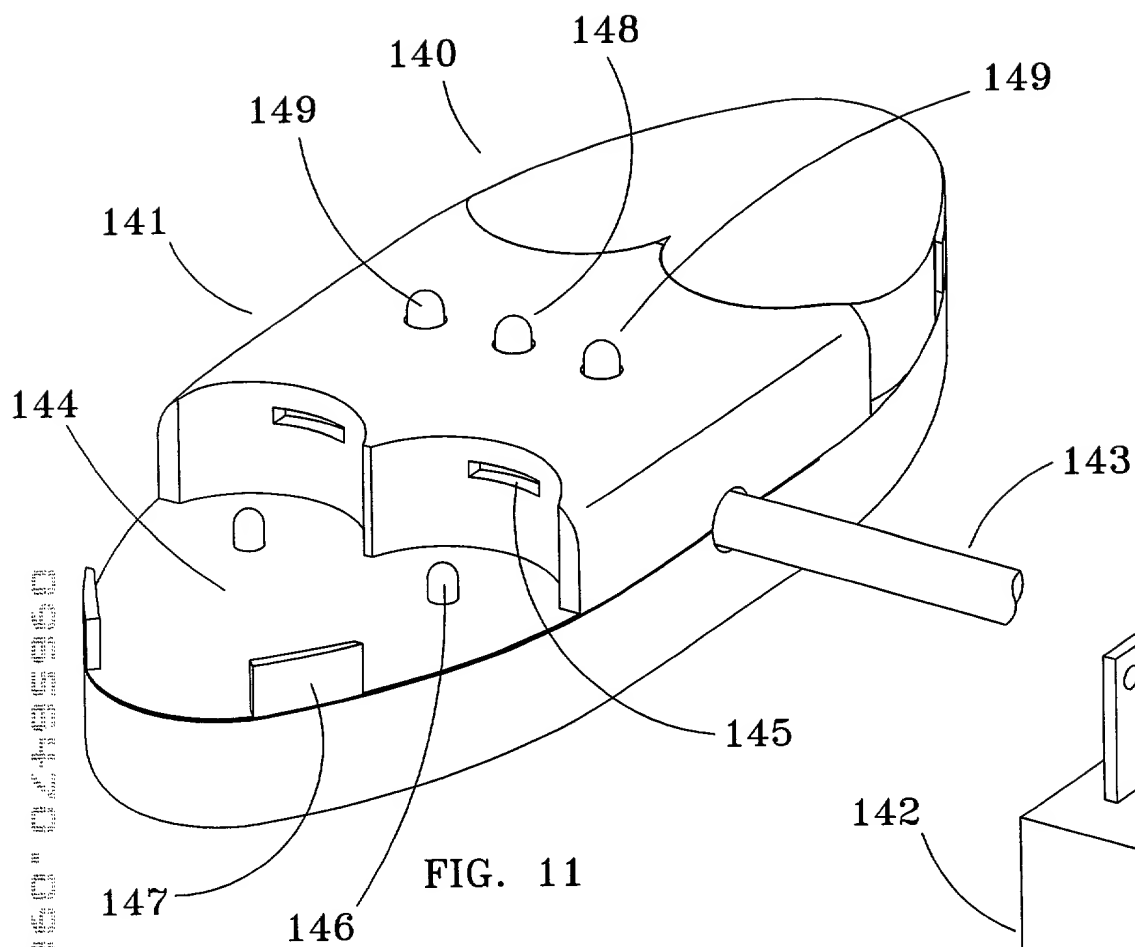


FIG. 8



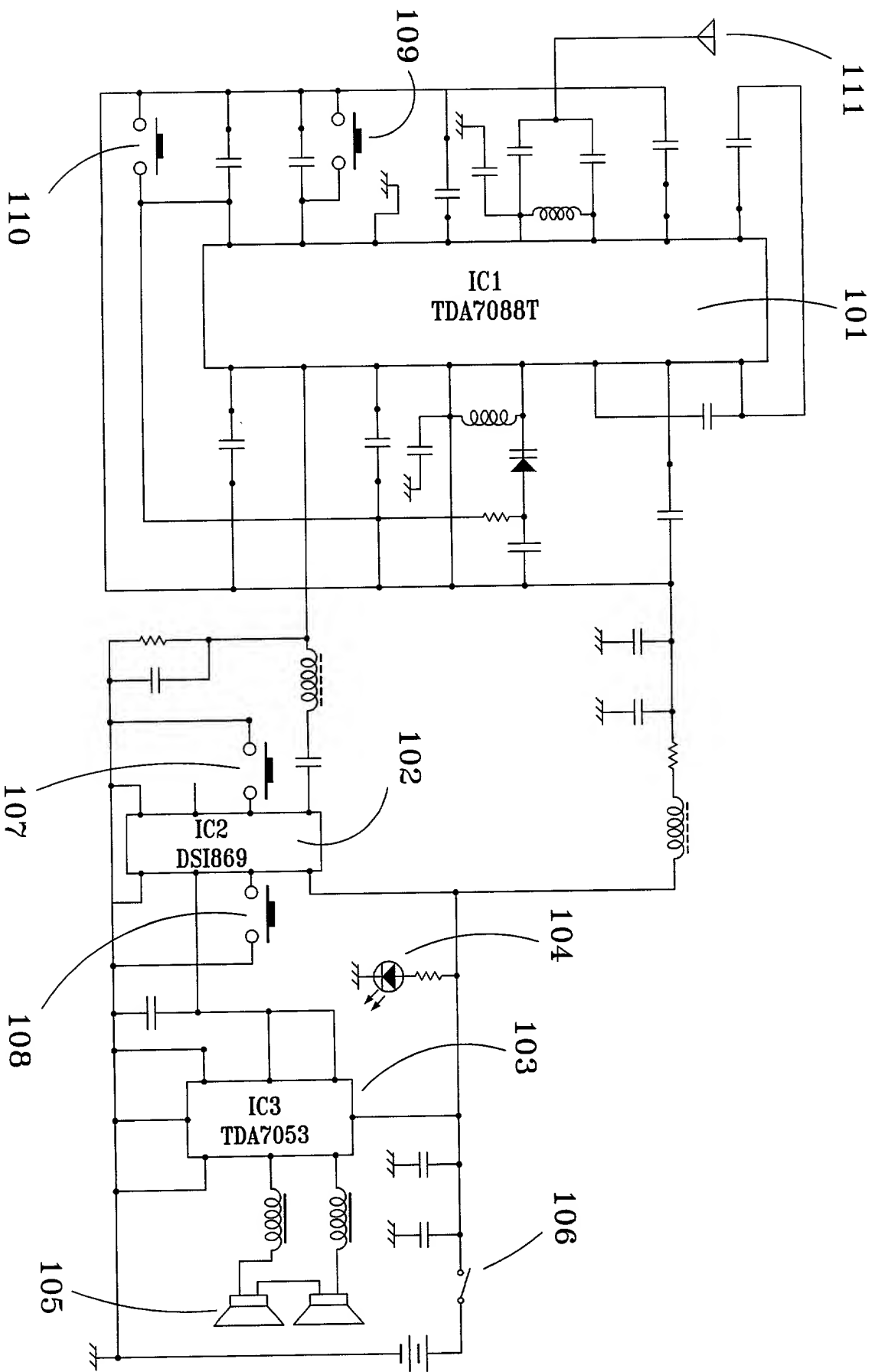


FIG. 13

DECLARATION  
Utility Application

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

HEAD SET SPEAKER AND STEREO RADIO PLAYING DEVICE,  
the specification of which

CHECK ONE:

- ☒ is attached hereto.
- ☐ was filed on \_\_\_\_\_ as  
Application Serial No. \_\_\_\_\_  
and was amended on \_\_\_\_\_ (if applicable).

I have read the applicable statutes and rules which I understand to describe subject matter which is material under 37 CFR 1.56(a).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application(s) for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

Application Number	Country	Date of Filing	Priority Claimed	
			Yes	No
<u>-None-</u>	_____	_____	_____	_____
_____	_____	_____	_____	_____

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I hereby claim the benefit under Title 35, United States Code §120, of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

Application Number                      Date of Filing                      Status - Patented, Pending or Abandoned

-None-                      \_\_\_\_\_                      \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

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POWER OF ATTORNEY

Glen Poss, of 11422 Charles Road, Nine Mile Falls, WA 99026,  
owner(s) of the application for the United States Letters Patent for an improvement in  
HEAD SET SPEAKER AND STEREO RADIO PLAYING DEVICE  
by Glen Poss, inventor


✓  
\_\_\_\_ executed on even date herewith or

\_\_\_\_ having Serial No. \_\_\_\_\_, filed \_\_\_\_\_, 19\_\_\_\_,

do(es) hereby appoint as attorney of record with full power of substitution and revocation, to  
prosecute this application and transact all business in the Patent and Trademark Office connected  
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(509) 838-8833 FAX telephone number.

I, the undersigned, declare that I am the (an) owner of the above-identified application, or if the  
owner is a corporation, partnership or other association, that I am authorized to make this  
appointment on behalf of the owner and I further declare that all statements made herein of my  
own knowledge are true and that all statements made on information and belief are believed to be  
true; and further that these statements were made with the knowledge that willful false statements  
and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title  
18 of the United States Code, and that such willful false statements may jeopardize the validity of  
the application or any patent issuing thereon.

  
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Date: \_\_\_\_\_

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